

Focused Site Inspection Prioritization Report

for

Belvidere Municipal Landfill #2

USEPA ID No. ILD 000 605 113

September 10, 1995

Prepared for
U.S. Environmental Protection Agency
Contract 68-W8-0064
Work Assignment 32-5JZZ

For U.S. Environmental Protection Agency, Region V

Approved by: Alan Altman

Date: 9/13/95

For Illinois Environmental Protection Agency

Approved by: _____

Date: _____

-0044-
W.C.

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1.0 Introduction

On December 13, 1994, the Alternate Remedial Contracting Strategy (ARCS) V contractor, was authorized, by approval of the work plan amendment by the U.S. Environmental Protection Agency (USEPA) Region V, to conduct a Focused Site Inspection Prioritization (FSIP) of several sites in Illinois.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) established a federal program for responding to the risks posed by uncontrolled releases of hazardous substances. CERCLA required the federal government to establish criteria for setting priorities among releases or threatened releases, and specified these criteria be used to establish the National Priorities List. USEPA responded to these mandates by developing the Hazardous Ranking System (HRS) to more accurately quantify the relative risk posed by hazardous waste substance releases. A revised HRS was published in 1990.

The objective of the FSIP is to update outstanding screening site inspections (SSIs) performed before the implementation of the revised HRS for which a final decision has not been made regarding further action. The FSIP will determine whether the existing SSI information meets a minimum standard to reflect the revised HRS, and if it does not, additional information by file review, reconnaissance, and sampling on an as-needed basis. The FSIP will evaluate the threats posed to human health and the environment, and provide sufficient documentation for USEPA to decide the appropriate course of action (no further remedial action planned, further evaluation, or preparation of a HRS package).

2.0 Site Background

2.1 Site History

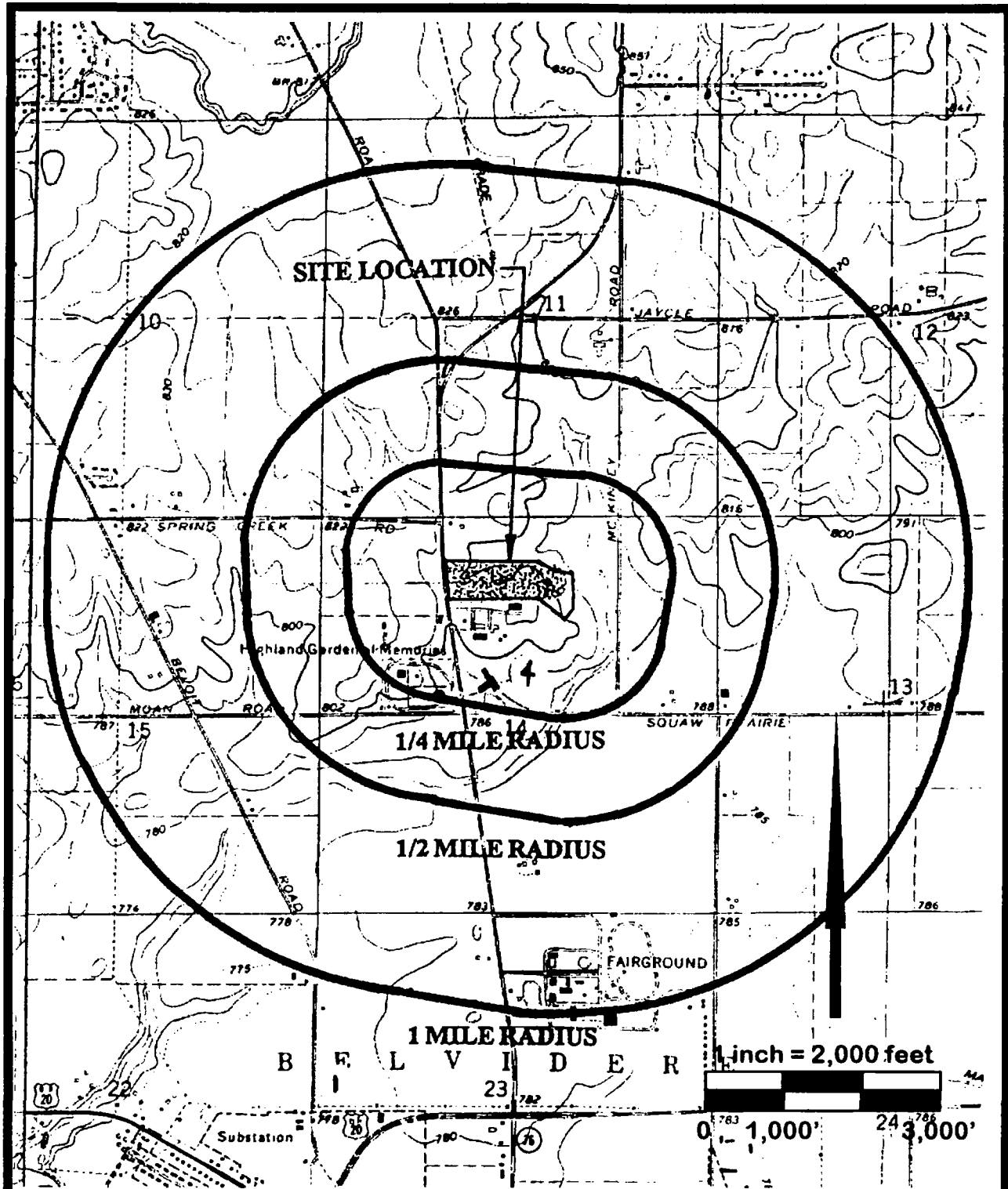
The Belvidere Municipal Landfill #2, located in Belvidere, Boone County, Illinois, is a 34-acre landfill. The topography in the site area ranges from rolling to flat. The location of the site is shown in Figure 1.

Belvidere Municipal Landfill #2, owned jointly by the City of Belvidere and Boone County, began receiving municipal and industrial waste in 1974. The site was initially discovered by USEPA in 1981 when Apache Foam Products filed a notification of hazardous waste site form pursuant to CERCLA section 103(c). According to file information, Apache Foam Products disposed of amines, amides, imides, and resins in the landfill from 1974 to 1979.

The landfill stopped accepting waste in September 1992. Final closure was initiated on September 18, 1992, and completed on May 27, 1994. Closure was completed under the Illinois regulations contained in Title 35 Illinois Administrative Code Part 807 and Part 815 Subpart E of the Illinois Environmental Protection Act, and Illinois Environmental Protection Agency (IEPA) guidelines.

2.2 Past Site Characterization Studies

In 1989, USEPA Field Investigation Team (FIT) personnel conducted an SSI at the Belvidere site and noted windblown waste and leachate from the landfill on a neighboring farm field. An inactive electrical transformer, formerly used at the site for the methane collection system, was also identified onsite. During the sampling event, seven surface soil samples, three monitoring well samples, and three residential well samples were collected. Analytical results of the soil samples indicated the presence of various volatile organic compounds (VOCs), semivolatile organic compounds, and metals. Analytical results of the monitoring well samples indicated the presence of various VOCs, semivolatile organic compounds, and metals in groundwater downgradient of the site. Analytical results of residential well samples indicated the presence of anthracene [3 parts per billion (ppb)] in a well serving 157 residents of an adjacent nursing home; however, attribution of this contaminant to the site may be questionable because the soil sample containing anthracene was qualified as estimated. Attribution of anthracene to groundwater contamination at the nearby nursing home well is difficult because anthracene was not detected in any of the onsite monitoring well samples, and an Illinois Department of Transportation



Site Location Map
 Focused Site Inspection Prioritization
 Belvidere Municipal Landfill #2
 Boone County, Illinois

Figure 1

SOURCE: USGS Caledonia (1975), Cherry Valley (1975), Belvidere North (1975), Belvidere South (1978) Quadrangle, 7.5 minute series.

depot separates the landfill from the nursing home. The depot may be an alternate source of the anthracene contamination. No surface water samples were collected.

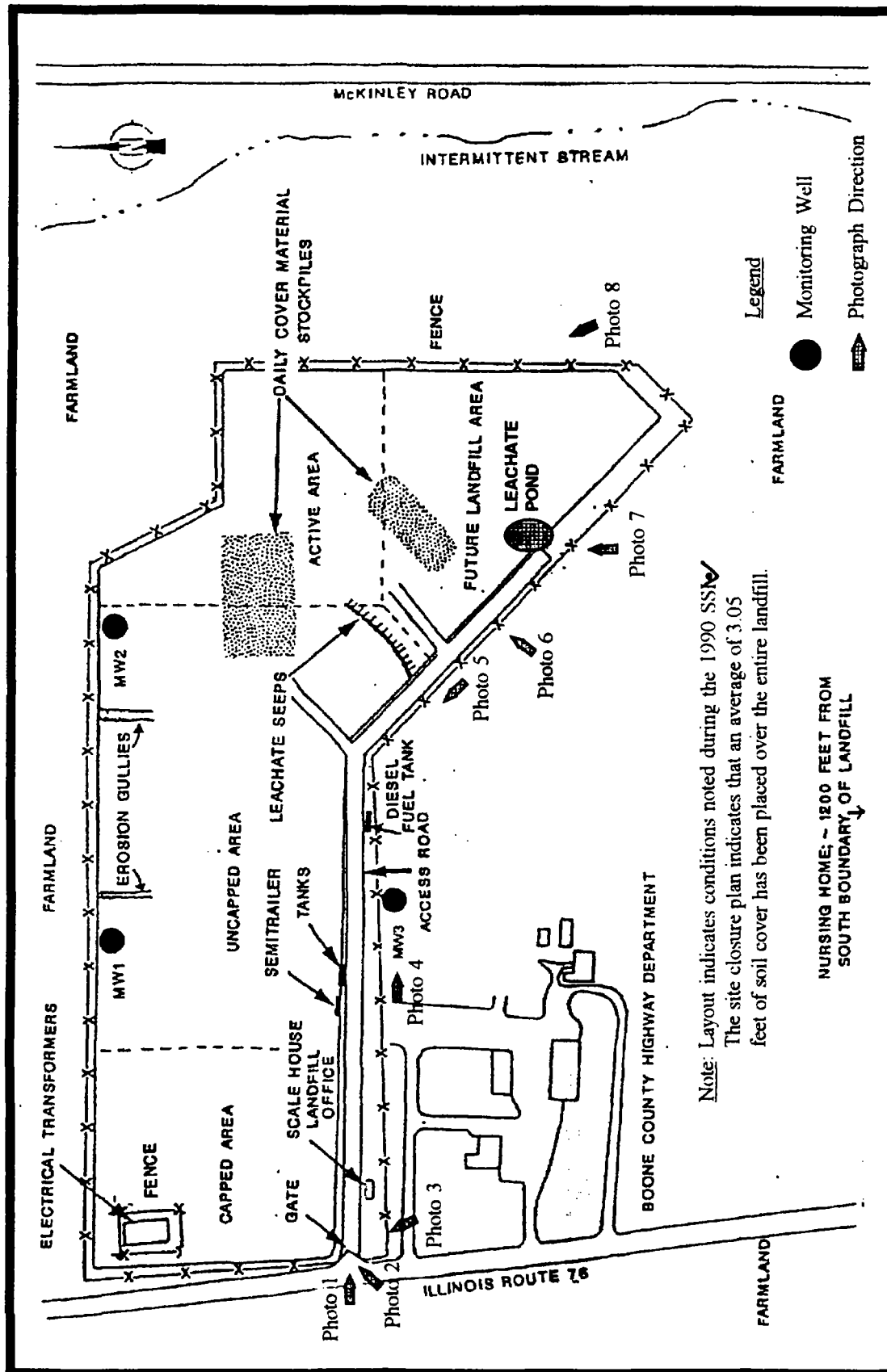
In 1993, the U.S. Geological Survey (USGS) collected a groundwater sample from a nearby residential well. Analytical results of this sample, contained in Appendix A, indicated the presence of vinyl chloride (11 ppb). Further sampling of this well by IEPA in 1994 indicated continued vinyl chloride contamination of the shallow 80 feet deep well. In 1995, the City of Belvidere and Boone County installed a new 405 feet deep well at the same residence. Analytical results of groundwater from the new deep well did not indicate contamination. Because vinyl chloride was detected in onsite monitoring wells and in the offsite residential well, the contamination is attributable to the site.

2.3 FSIP Site Reconnaissance/Sampling

An offsite reconnaissance investigation was conducted on May 18, 1995. The reconnaissance was conducted offsite because ARCS V contractor personnel were denied access to the site. Photographs taken during the reconnaissance are contained in Appendix B. Figure 2 is a site sketch and photograph location map.

A leachate ponding area was seen near the end of the haul road on the southeastern portion of the landfill. The leachate had a very strong sulfur odor, but did not appear to be migrating offsite. Leachate seeps were also noted on the eastern slope of the landfill and in two locations on the northern slope of the landfill. Water was seen ponding on the northern edge of the landfill below a seep near the western corner. The water appeared to have a sheen, but had no odor. Vegetation on the landfill did not appear to be stressed. The western edge of the site was obscured by tall shrubs growing inside the fence line. A nursing home is located approximately 1,200 feet south of the landfill. Directly south of the site, the state and county highway departments have maintenance facilities on an adjacent property. Highland Memorial Funeral Home, Inc., is located west of the landfill.

ARCS contractor personnel spoke with Mr. Donald Grenke, the owner of Highland Memorial Funeral Home, Inc. Mr. Grenke indicated that he has had problems with his well for approximately 15 years. He provided documentation stating that vinyl chloride was detected in well water samples collected at the funeral home by USGS in 1993. As a result, Boone County recently paid to have a new groundwater well installed in a deeper aquifer at the funeral home. Mr. Grenke also



Site Sketch / Photo Location Map
 Focused Site Inspection Prioritization
 Belvidere Municipal #2
 Belvidere, Boone County, Illinois

Figure 2

SOURCE: Ecology & Environment SSI 1990, revised 8/7/95

indicated that while he has not experienced methane gas accumulation in his basement, the Illinois Department of Transportation has had to evacuate their building on several occasions due to methane gas build-up in their facility.

3.0 Pathway Evaluation

This FSIP evaluated three contaminant migration pathways: air, groundwater, and soil exposure. The nearest perennial surface water body is an unnamed stream located more than 2 miles southwest of the Belvidere Municipal Landfill site; therefore, the surface water pathway was not evaluated.

3.1 Groundwater Pathway

Belvidere Municipal Landfill #2 is located in northwestern Illinois, where the important aquifers are comprised of sand and gravel, sandstone, limestone, and dolomite. In the landfill area, the surficial deposits contain the glacial till aquifer. The surficial deposits are comprised primarily of fine sand, clay, and gravel, and exist to a depth of approximately 240 feet below land surface (bls). According to onsite monitoring well records, groundwater is found at approximately 25 feet bls. Underlying the glacial till aquifer is a 30-foot layer of cemented gravel, which is underlain by Ordovician bedrock. The Ordovician bedrock is comprised of limestone, dolomite, and sandstone. In the vicinity of the site, two water-bearing layers exist within the Ordovician bedrock, including the Galena-Platteville limestone and dolomite, and the Glenwood-St. Peter sandstone. Because the IEPA well records did not indicate which of these two aquifers the public wells were withdrawing groundwater from, and because these layers are not separated by a confining layer, these water-bearing layers were combined for evaluation and referred to as the Ordovician bedrock aquifer. The Ordovician bedrock aquifer is found at approximately 240 feet bls in the site vicinity and continues to depths more than 500 feet bls. There are no karst aquifers within a 4-mile radius of the site.

All residential wells were assumed to be screened in the glacial till aquifer. In August 1993, USGS reported detection of VOCs in the Highland Memorial Funeral Home/residential well, which is approximately **Non-responsive** landfill and is the nearest residential drinking water well drawing from the glacial drift aquifer. There are 2 public wells **Non-responsive** the site. The City of Belvidere has a drinking water **Non-responsive** that serves approximately 2,146 people. Consumers IL WTR Candlewick has a drinking water well **Non-responsive** that serves approximately 1,432 people. A total of 7,655 people are assumed to obtain drinking water from the glacial till aquifer within 4 miles of Belvidere Municipal Landfill #2.

The Maple Crest Nursing Home, City of Belvidere, and Park Meadowland West Mobile Home Park draw groundwater from the Ordovician bedrock aquifer within 4 miles of the site. The nursing home well, serving an estimated 157 people, **Non-responsive**. The Belvidere municipal wells, serving an estimated 15,022 people, are **Non-responsive**. The Park Meadowland West Mobile Home Park has 1 public well located approximately **Non-resp** that serves 112 people. A total of 15,291 people use groundwater from the Ordovician bedrock aquifer within 4 miles of the site.

3.2 Surface Water Pathway

Overland flow of surface water from the site would travel approximately 2.8 miles southwest along an intermittent stream before entering the nearest perennial surface water body, which is an unnamed stream. Because the overland flow distance to a perennially flowing surface water body is more than 2 miles, a surface water pathway was not evaluated for the Belvidere Municipal Landfill #2 site.

3.3 Soil Exposure Pathway

Closure of Belvidere Municipal Landfill #2 has been completed by the City of Belvidere and Boone County, but not approved by IEPA. According to the certification of landfill closure report, final cover design consists of 2 feet of low permeability clay, 6 inches of topsoil, and native grasses and vegetation. Average cover thickness is reportedly 3.05 feet. There are no known residences or schools within 200 feet of the Belvidere Municipal Landfill #2. Approximately 312 individuals reside within 1 mile of the site.

3.4 Air Pathway

In January 1995, several buildings located adjacent to the Belvidere Municipal Landfill #2 were monitored for methane infiltration. Methane was detected in ambient air in an adjacent Illinois Department of Transportation facility in concentrations up to 34 percent of the lower explosive limit (LEL). Immediate steps were reportedly taken to ventilate the area and to seal major conduits of gas infiltration into the building. There are threatened and endangered bird species within 2 to 4 miles of the site.

4.0 Summary

The ARCS V contractor conducted a thorough review of the available files associated with the Belvidere Municipal Landfill #2 and concluded that the landfilled wastes constitute a possible source of contamination for several migration pathways. Final closure of the landfill was completed by the City of Belvidere and Boone County on May 27, 1994, but has not yet been approved by IEPA. A groundwater assessment report, dated January 1995, indicates that VOCs are present in the sand and gravel at the water table adjacent to the landfill. Methane gas was detected at concentrations up to 34 percent LEL in an adjacent Illinois Department of Transportation facility. Plans have been developed for the installation of a landfill gas management system.

During an offsite reconnaissance conducted on May 18, 1995, by the ARCS V contractor, a leachate ponding area was observed near the end of the haul road on the southeast area of the landfill. The leachate had a very strong sulfur odor, but did not appear to be migrating offsite. Leachate seeps were also noted on the eastern slope of the landfill and in two locations on the northern slope of the landfill. Background information does not indicate the presence of a leachate collection system in the completed phases of the landfill. No sampling was conducted for the FSIP at the Belvidere Municipal Landfill #2.

5.0 References

- ARCS Contractor, 1995. Field Log Book, Belvidere Municipal Landfill #2, Site Reconnaissance, May 15.
- Ecology & Environment, 1990. *Site Screening Investigation Report* for Belvidere Municipal Landfill #2, March 23.
- HRS Final Rule, 1990. Federal Register, Vol. 55, No. 241, Friday, December 14, Rules and Regulations.
- Illinois Environmental Protection Agency (IEPA), 1992. Division of Public Water Supplies, *GWM Raw Source Location Report*, July 16.
- Logan, Melissa, 1995. ARCS Contractor, telephone memorandum with Katherine Geyer, IEPA, April 25. Subject: IEPA Site Activity.
- Logan, Melissa, 1995. ARCS Contractor, memorandum to file, April 24. Subject: Threatened and Endangered Species.
- Logan, Melissa, 1995. ARCS Contractor, memorandum to file, April 29. Subject: Results of Calculation of Air and Groundwater Populations.
- Mills, Patrick C., 1995. U.S. Geological Survey, Water Resources Division, in correspondence with Donald Grenke, Highland Garden of Memories, December 10. Subject: Analytical Results of Groundwater Samples.
- RMT, Inc., 1995a. *Groundwater Assessment Report* for Belvidere Municipal Landfill #2, January.
- RMT, Inc., 1995b. *Certification of Landfill Closure Report* for Belvidere Municipal Landfill #2, March.
- RMT, Inc., 1995c. Design Report for Landfill Gas Control System for the Belvidere Municipal Landfill #2, April.

- Terrinoni, Kenneth, 1995. County Administrator, Boone County Government, in letter to John Noyes, ARCS Contractor, July 11. Subject: Belvidere Landfill No. 2.
- U.S. Department of Agriculture, 1985. Soil Conservation Service, Urban Hydrology for Small Watersheds, Technical Release 55, June.
- U.S. Department of Commerce, 1990. Economics, and Statistics Administration, Bureau of the Census, *1990 Census of Population and Housing Characteristics*, Illinois.
- U.S. Geological Survey Topographic Maps. 7.5 Minute Series Quadrangles for Caledonia, IL; Cherry Valley, IL; Belvidere North, IL; and Belvidere South, IL.

Appendix A
Analytical Results of Nearby Residential Well

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

HEM1 HGM2-

80' Well

Name: COMPUCHEM.RTP

Contract: 68D10083

EXL70

OFFICE
FROM
U

Lab Code: COMPU Case No.: 20410 SAS No.: _____ SDG No.: EXL50

Matrix: (soil/water) WATER

Lab Sample ID: 565224

Sample wt/vol: 5.0 (g/mL) ML

Lab File ID: CN065224B54

Level: (low/med) LOW

Date Sampled: 7/20/93
Date Received: 07/23/93

Moisture: not dec. _____

Date Analyzed: 07/27/93

Column: DB-624 ID: 0.530 (mm)

Dilution Factor: 1.0

Oil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:

Q

74-83-9-----Chloromethane	10	U
74-83-9-----Bromomethane	10	U
75-01-4-----Vinyl Chloride	11	
75-00-3-----Chloroethane	1	J
75-09-2-----Methylene Chloride	10	BJI/
67-64-1-----Acetone	10	U
75-15-0-----Carbon Disulfide	10	U
75-35-4-----1,1-Dichloroethene	10	U
75-34-3-----1,1-Dichloroethane	10	U
540-59-0-----1,2-Dichloroethene (total)	1	J
67-66-3-----Chloroform	10	U
107-06-2-----1,2-Dichloroethane	10	U
78-93-3-----2-Butanone	10	U
71-55-6-----1,1,1-Trichloroethane	10	U
56-23-5-----Carbon Tetrachloride	10	U
75-27-4-----Bromodichloromethane	10	U
78-87-5-----1,2-Dichloropropane	10	U
10061-01-5-----cis-1,3-Dichloropropene	10	U
79-01-6-----Trichloroethene	10	U
124-48-1-----Dibromochloromethane	10	U
79-00-5-----1,1,2-Trichloroethane	10	U
71-43-2-----Benzene	10	U
10061-02-6-----Trans-1,3-Dichloropropene	10	U
75-25-2-----Bromoform	10	U
108-10-1-----4-Methyl-2-Pentanone	10	U
591-78-6-----2-Hexanone	10	U
127-18-4-----Tetrachloroethene	10	U
79-34-5-----1,1,2,2-Tetrachloroethane	10	U
108-88-3-----Toluene	10	U
108-90-7-----Chlorobenzene	10	U
100-41-4-----Ethylbenzene	10	U
100-42-5-----Styrene	10	U
1330-20-7-----Xylene (total)	10	U

FORM I VOA

3/90

SAMPLE DATA PACKAGE 20410 EXL50

131

Lab Name: AQUATEC, INC.

Contract: 68D90135

EWL71

Lab Code: AQUAI Case No.: 22259 SAS No.: 8018Q2 SDG No.: EWL58

Lab Sample ID: 223283

Date Received: 06/02/94

Lab File ID: L222847.D

Date Analyzed: 06/10/94

Purge Volume: 5.0 (mL)

Dilution Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION (ug/L)	Q
74-87-3	Chloromethane	1	U
74-83-9	Bromomethane	1	U
75-01-4	Vinyl Chloride	8	
75-00-3	Chloroethane	1	U
75-09-2	Methylene Chloride	2	U
67-64-1	Acetone	5	U
75-15-0	Carbon Disulfide	1	U
75-35-4	1,1-Dichloroethene	1	U
75-34-3	1,1-Dichloroethane	1	U
156-59-2	cis-1,2-Dichloroethene	2	
156-60-5	trans-1,2-Dichloroethene	1	U
67-66-3	Chloroform	1	U
107-06-2	1,2-Dichloroethane	1	U
78-93-3	2-Butanone	5	U
74-97-5	Bromochloromethane	1	U
71-55-6	1,1,1-Trichloroethane	1	U
56-23-5	Carbon Tetrachloride	1	U
75-27-4	Bromodichloromethane	1	U
78-87-5	1,2-Dichloropropane	1	U
10061-01-5	cis-1,3-Dichloropropene	1	U
79-01-6	Trichloroethene	1	U
124-48-1	Dibromochloromethane	1	U
79-00-5	1,1,2-Trichloroethane	1	U
71-43-2	Benzene	1	U
10061-02-6	trans-1,3-Dichloropropene	1	U
75-25-2	Bromoform	1	U
108-10-1	4-Methyl-2-Pentanone	5	U
591-78-6	2-Hexanone	5	U
127-18-4	Tetrachloroethene	1	U
79-34-5	1,1,2,2-Tetrachloroethane	1	U
106-93-4	1,2-Dibromoethane	1	U
108-88-3	Toluene	1	U
108-90-7	Chlorobenzene	1	U
100-41-4	Ethylbenzene	1	U
100-42-5	Styrene	1	U
1330-20-7	Xylene (total)	1	U
541-73-1	1,3-Dichlorobenzene	1	U
106-46-7	1,4-Dichlorobenzene	1	U
95-50-1	1,2-Dichlorobenzene	1	U
96-12-8	1,2-Dibromo-3-chloropropane	1	U

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PAGE: 1

PROJECT NAME: BOONE CO
 PROJECT NUMBER: 02628.18
 LAB SAMPLE NUMBER: 7073-001
 STATION ID: 405' Well
 WI DNR LAB ID: 113138520

REPORT DATE: 05/03/95
 COLLECTION DATE: 05/02/95
 ANALYSIS DATE: 05/03/95
 METHOD: 8010

VOLATILE ORGANICS ANALYSIS REPORT

COMPOUND	RESULT	EQL	CODE	UNITS
Chloromethane	<1.0	1.0		ug/L
Bromomethane	<5.0	5.0		ug/L
Vinyl chloride	<1.0	1.0		ug/L
Dichlorodifluoromethane	<2.0	2.0		ug/L
Chloroethane	<1.0	1.0		ug/L
Methylene chloride	<1.0	1.0		ug/L
Fluorotrichloromethane	<1.0	1.0		ug/L
1,1-Dichloroethene	<1.0	1.0		ug/L
1,1-Dichloroethane	<1.0	1.0		ug/L
1,2-Dichloroethene, total	<2.0	2.0		ug/L
Chloroform	<1.0	1.0		ug/L
1,2-Dichloroethane	<1.0	1.0		ug/L
1,1,1-Trichloroethane	<1.0	1.0		ug/L
Carbon tetrachloride	<1.0	1.0		ug/L
Bromodichloromethane	<1.0	1.0		ug/L
1,2-Dichloropropane	<1.0	1.0		ug/L
cis-1,3-Dichloropropene	<1.0	1.0		ug/L
Trichloroethene	<1.0	1.0		ug/L
1,1,2-Trichloroethane	<1.0	1.0		ug/L
trans-1,3-Dichloropropene	<1.0	1.0		ug/L
Chlorodibromomethane	<1.0	1.0		ug/L
2-Chloroethylvinylether	<5.0	5.0		ug/L
Bromoform	<2.0	2.0		ug/L
Tetrachloroethene	<2.0	2.0		ug/L
1,1,2,2-Tetrachloroethane	<1.0	1.0		ug/L
Chlorobenzene	<1.0	1.0		ug/L
1,3-Dichlorobenzene	<1.0	1.0		ug/L
1,2-Dichlorobenzene	<1.0	1.0		ug/L
1,4-Dichlorobenzene	<1.0	1.0		ug/L

Appendix B
Site Reconnaissance Photographs

Date: May 18, 1995
Time: 0932
Photo Taken By: J. Noyes
Photo Number: 1
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
East
Description: From entrance
on I76.



Date: May 18, 1995
Time: 0932
Photo Taken By: J. Noyes
Photo Number: 2
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
Northeast
Description: Photo of
landfill.



Date: May 18, 1995
Time: 0937
Photo Taken By: J. Noyes
Photo Number: 3
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
Northwest
Description: Monitoring
wells located at the SW
corner of the site near the
IDOT facility.



Date: May 18, 1995
Time: 0944
Photo Taken By: J. Noyes
Photo Number: 4
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
East
Description: Two dead
pine trees with three
monitoring wells in the
background.



Date: May 18, 1995
Time: 0954
Photo Taken By: J. Noyes
Photo Number: 5
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
Northwest
Description: From south
center of site.



Date: May 18, 1995
Time: 0956
Photo Taken By: J. Noyes
Photo Number: 6
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
North
Description: From fence,
looking at leachate seep.



Date: May 18, 1995
Time: 1000
Photo Taken By: J. Noyes
Photo Number: 7
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
North
Description: Ponding leachate,
stressed vegetation, foul odor.



Date: May 18, 1995
Time: 1007
Photo Taken By: J. Noyes
Photo Number: 8
Site/ILD No.: Belvidere
Municipal #2/
ILD000605113
Direction of Photo: Facing
Northwest
Description: Photo of
backside of landfill.

